M. E. STEPHENSON.

ARCH SUPPORT.

APPLICATION FILED MAR. 12, 1914.

1,113,380. Patented Oct. 13, 1914.

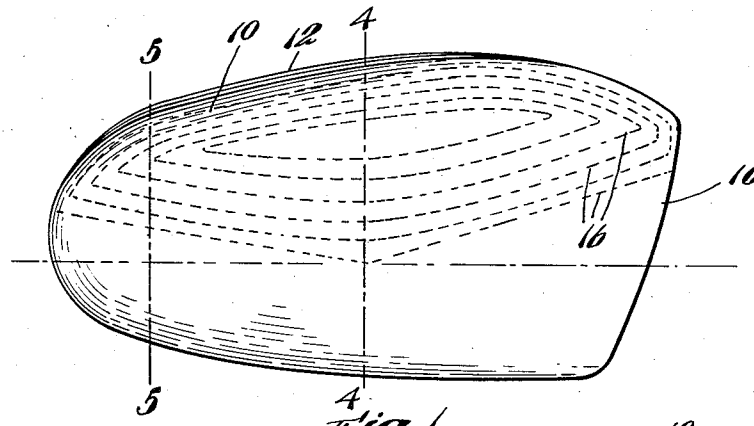


Fig. 1.

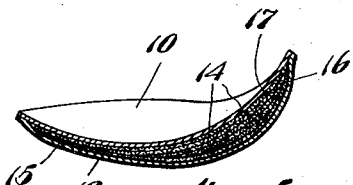


Fig. 5.

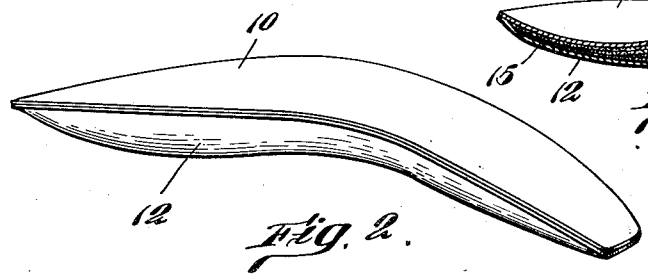


Fig. 2.

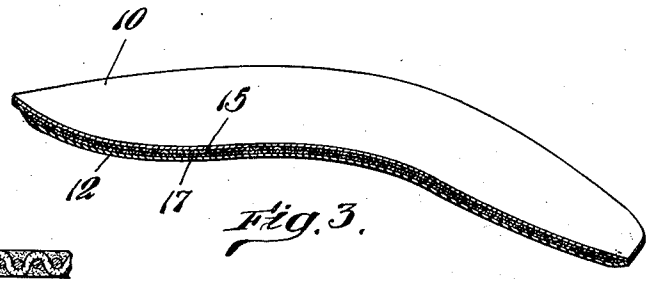


Fig. 3.

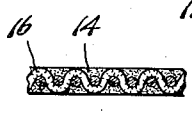


Fig. 6.

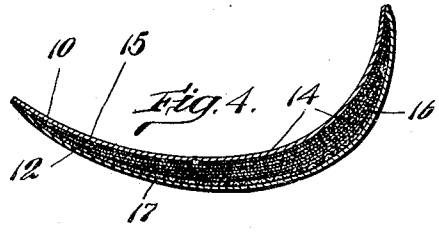


Fig. 4.

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UNITED STATES PATENT OFFICE.

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ARCH-SUPPORT.

1,113,380. Specification of Letters Patent. Patented Oct. 13, 1914.

Application filed March 12, 1914. Serial No. 824,292.

To all whom it may concern:

Be it known that I, MILTON E. STEPHENSON, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Arch-Supports, of which the following is a specification.

This invention relates to combined arch and heel-supports and includes supports for arches as well as other forms of surgical supports, to which the invention is applicable.

The invention has for its object the construction of a support which is very light and exceedingly durable and may be made to exactly fit a plaster-cast, and will retain its original shape for a long period of time, regardless of the hardship to which it may be subjected while in use.

My invention involves a filler, and preferably a molded filler, having top and bottom pieces of textile fabric or equivalent material, which pieces are usually arranged to entirely inclose a filling substance, and reinforcements which may be associated therewith. The filling substance is composed of a cementitious composition which hardens upon drying and which may be molded upon a plaster-cast, thereby to exactly correspond to the contour thereof, and said filling substance may, and preferably, does have embedded in it numerous pieces of material, such for instance as plies of textile fabric of different dimensions, which are superimposed, said pieces in addition to the top and bottom pieces serving to reinforce and strengthen the filler. Such a filler is very rigid along its thickest portion and quite flexible along its thinnest portion and when molded on a cast its thick rigid portion is arranged along its inner side and the thin flexible portion is arranged along its outer side.

The invention also has for its object the association of said filler with upper and under covers which are or may be adhesively secured thereto.

The invention also has for its object the production of a support which is made long enough to include both the arch and heel-portions of the foot and made rigid throughout its entire length on its inner or long shank side and flexible throughout its entire length on its outer or short shank side, and is of gradually increasing thickness from its side edges inward toward the middle, such gradual increase being much steeper on the inner or long shank side, so that the thickest part of the support is arranged at one side, as for instance the long shank side of the middle. Such a support maintains the inner or long shank side of the foot including the heel, at an elevation, whereby the preponderance of weight of the person is borne essentially by the outer or short shank side, which is a great advantage. In correcting fallen arches in a manner to give ease and comfort to the person, I have discovered that by elevating both the inner side of the arch and the inner side of the heel such result may be better accomplished.

Figure 1 is a plan view of a combined arch and heel-support embodying this invention. Fig. 2 is a side elevation of the same. Fig. 3 is a longitudinal vertical section of the same. Fig. 4 is a transverse vertical section of the same, taken on the dotted line 4—4, Fig. 1. Fig. 5 is a transverse vertical section of the same taken on the dotted line 5—5, Fig. 1. Fig. 6 is a sectional detail of a portion of a piece of textile fabric embedded in a cementitious composition.

Referring to the drawing 10 represents the upper cover which may be composed of leather, and 12, the under cover which may be composed of textile fabric, such as khaki for instance, although it will be understood that my invention involves making said covers of any other material. These covers are of a shape to correspond to the shape of the support and to entirely cover the upper and under sides thereof, and to inclose a filler, and are made slightly larger than the filler, so that the edges of said covers may be brought into engagement with each other, to be adhesively secured together. The filler is composed of top and bottom pieces 17 and 15 and a filling substance 14 with or without reinforcements arranged between them. The filling substance consists of a cementitious composition which contains a solvent, and which, upon evaporation of the solvent, becomes very hard and waterproof and capable of withstanding a high temperature without softening. Such a composition may include one of the numerous modified forms of cellulose. Before evaporation of the solvent said composition is adhesive. The filler is molded on a plas-

ter-cast, so that it will exactly correspond to the contour thereof, and is or may be then arranged between and adhesively secured to the covers, whereby it is inclosed. It is preferable, however, to reinforce this molded filler, in addition to the reinforcement given to it by the top and bottom pieces, and, as here shown, pieces of material 16 are embedded in the filling substance for this purpose. These pieces of material may be composed of linen, which is well suited for the purpose, for the reason that it is very absorptive, and quickly absorbs the cementitious composition, while the latter contains a solvent, and becomes thoroughly impregnated with it. As here shown these numerous pieces 16 of textile fabric, which are of different shapes and dimensions, are superimposed. The bottom-piece 15, is of a shape corresponding to the contour of the support, but slightly smaller than the covers, and the numerous plies 16, are arranged in a pile above said bottom-piece, and the top-piece 17, is of a shape and size to correspond with the bottom-piece 15. The numerous plies 16 are made as strips of varying widths and lengths, as for instance, each ply from the bottom up may be made narrower and slightly shorter than the ply beneath it, so that when superimposed the pile will taper toward the top, and said plies are arranged essentially on the long shank side of the filler, so that said side becomes of the greatest thickness. The pile of plies is formed with a very steep taper on the long shank side and a very gradual taper on the short shank side, so that the thickest portion of the pile is arranged between the inner edge and the middle of the filler. The bottom-ply 16 of the tapering pile may be made long enough to extend throughout the length of the support, so as to include the heel-portion, but the plies above it are each made slightly shorter than the ply below it, thus providing a thick side-portion throughout the entire length of the filler, the particular point being that a thickened side-portion is produced which is coextensive with the inner or long shank side of the support and the inner side of the heel.

In the manufacture of one form of support the filler is formed on a plaster-cast, by arranging thereon first the bottom-piece 15, then applying alternately layers of cementitious composition and plies 16, and lastly arranging thereon the top piece 17, but in case the reinforcing plies 16 are not required then the cementitious composition will be applied in layers, to facilitate the drying operation. If arranged in a thick solid mass a very long time is required for drying. The solvent for the cementitious composition is allowed to evaporate while the component parts repose on said cast, thus to harden, and then the hardened or molded filler is removed therefrom which it will be understood accurately corresponds to the contour of the cast, and its thick side-portion is very hard while its thin side-portion is quite flexible. The top and bottom pieces of the filler become so thoroughly impregnated with the cementitious composition as to form in conjunction therewith a solid body or mass. The upper and under covers are or may then be secured to the upper and under sides of the filler by an adhesive compound, the same cementitious composition preferably being employed that is employed in the filling substance. When the upper and under covers are first applied to the filler, the component parts are preferably placed on the same plaster-cast and held in engagement therewith while the adhesive composition dries and hardens. As the upper and under covers are slightly larger than the filler their edges will be brought into engagement with each other and adhesively secured together.

The method of making the support herein described is described and claimed in another application Serial No. 824,291 filed March 12, 1914.

I claim:—

1. The arch-support herein described consisting of upper and under covers and a molded filler of a cementitious composition which hardens upon drying, said filler being arranged between and adhesively secured to said covers.

2. The arch-support herein described consisting of upper and under covers and a molded filler of a cementitious composition which hardens upon drying and reinforced by textile material, said filler being arranged between and adhesively secured to said covers.

3. The arch-support herein described comprising a molded filler of a varying thickness and composed of a cementitious composition which hardens upon drying and is very rigid along its thickest portion and quite flexible along its thinnest portion.

4. The arch-support herein described comprising a molded filler composed of a cementitious composition which hardens upon drying, and numerous pieces of material, of different dimensions embedded in said composition which serve as reinforcements therefor.

5. The arch-support herein described comprising a molded filler composed of a cementitious composition which hardens upon drying, and numerous layers of textile fabric superimposed and embedded in said composition.

6. The arch-support herein described comprising a molded filler composed of a cementitious composition which hardens upon drying, and numerous plies of textile fabric

of different dimensions embedded in said composition and arranged one above the other to form a pile with its highest portion at one side of the middle.

7. The arch-support herein described comprising a molded filler composed of a cementitious composition which hardens upon drying, and top and bottom pieces adhesively secured to and impregnated with said composition.

8. The arch-support herein described comprising a molded filler composed of a cementitious composition which hardens upon drying, and numerous pieces of material, of different dimensions embedded in said composition, and top and bottom pieces adhesively secured to said composition thereby inclosing it.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

MILTON E. STEPHENSON.

Witnesses:

B. J. NOYES,
H. B. DAVIS.